

Section 5 GPR Human Remains Report

5.1 Test Excavation 096

5.1.1 Excavation Results

Test Excavation 96 (T-096) consisted primarily of construction fill and various disturbed, burned historic layers to a depth of 1.29 mbs where natural gravelly clay loam was observed. The test excavation contained a subsurface, culturally enriched, former A-horizon (Stratum II) (SIHP# 50-80-14-7427). Features 1 and 2 (SIHP# -7427) were documented within the excavation, although they were related to modern/historic events and located above the A-horizon. A former burned A-horizon which was composed of gravelly silty clay loam was also found at a depth of 1.15 mbs to 1.20 mbs and designated as Stratum Ii (SIHP# -7427). This culturally enriched layer contained faunal bone fragments, rusted metal fragments, unidentified burnt material and slag inclusions. In addition some glass and ceramic fragments were recovered to further indicate a burned, historic layer.

A human talus (SIHP# -7427 Feature 3) was recovered from the backfill soil from Stratum If (approx. 0.7 mbs). Stratum If was a gravelly sandy loam that had a dark gray color (2.5Y 4/1) and was found from 0.6 mbs to 0.75 mbs. Stratum If contained nails, ceramic fragment, and glass fragments as well as the human talus bone. The human bone was isolated and previously disturbed since it was found in a fill stratum. The talus was identified by a CSH osteologist as an older adult. The sex was indeterminate. The material in the bin where the talus was found was screened thoroughly and the area of the test excavation where the bucket had been excavating was also screened with no further bone recovery or any other significant cultural recovery.

SIHP# -7427 Feature 1 was the corner of a building foundation along the west excavation wall at the start of Stratum Id at a depth of 0.27 mbs to 1.10 mbs. Red brick and concrete with basalt boulder foundation made up this feature. This could have been a part of the City Mill Company building found in the 1914 Sanborn fire insurance map.

SIHP# -7427 Feature 2 was a concrete slab and possible building foundation remnant of the old City Mill facility found in the west wall of T-096 and intruding into Stratum Ic and Id at a depth of 0.27 mbs to 0.48 mbs.

5.1.2 GPR Interpretation

The human remains encountered during the excavation of T-096 consisted of a single talus discovered in the back dirt pile. It is very difficult for the GPR to resolve such a small object, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features observed during excavation ().

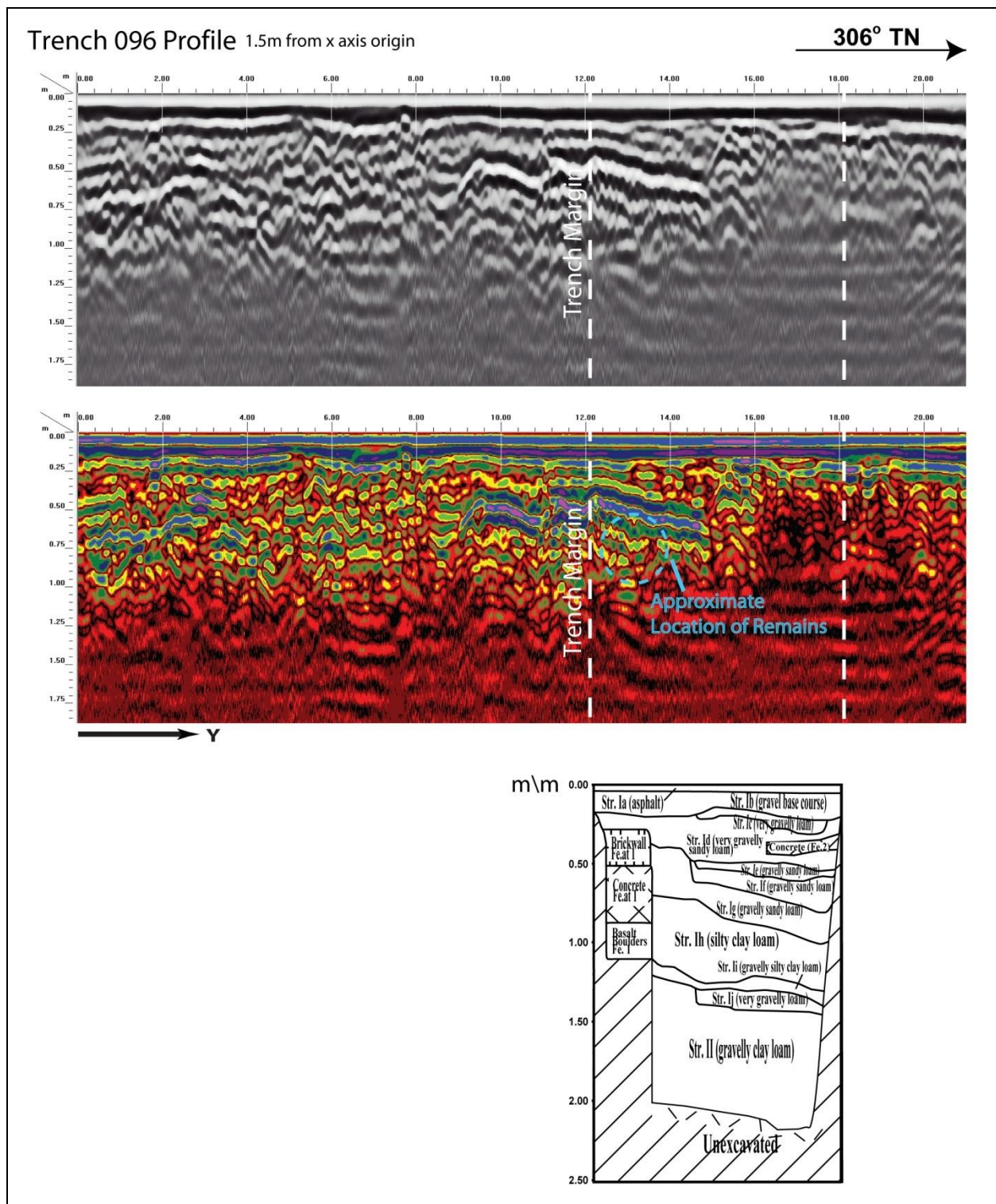


Figure 7. Visual comparison of excavated profile and GPR signal profile for Test Excavation 096

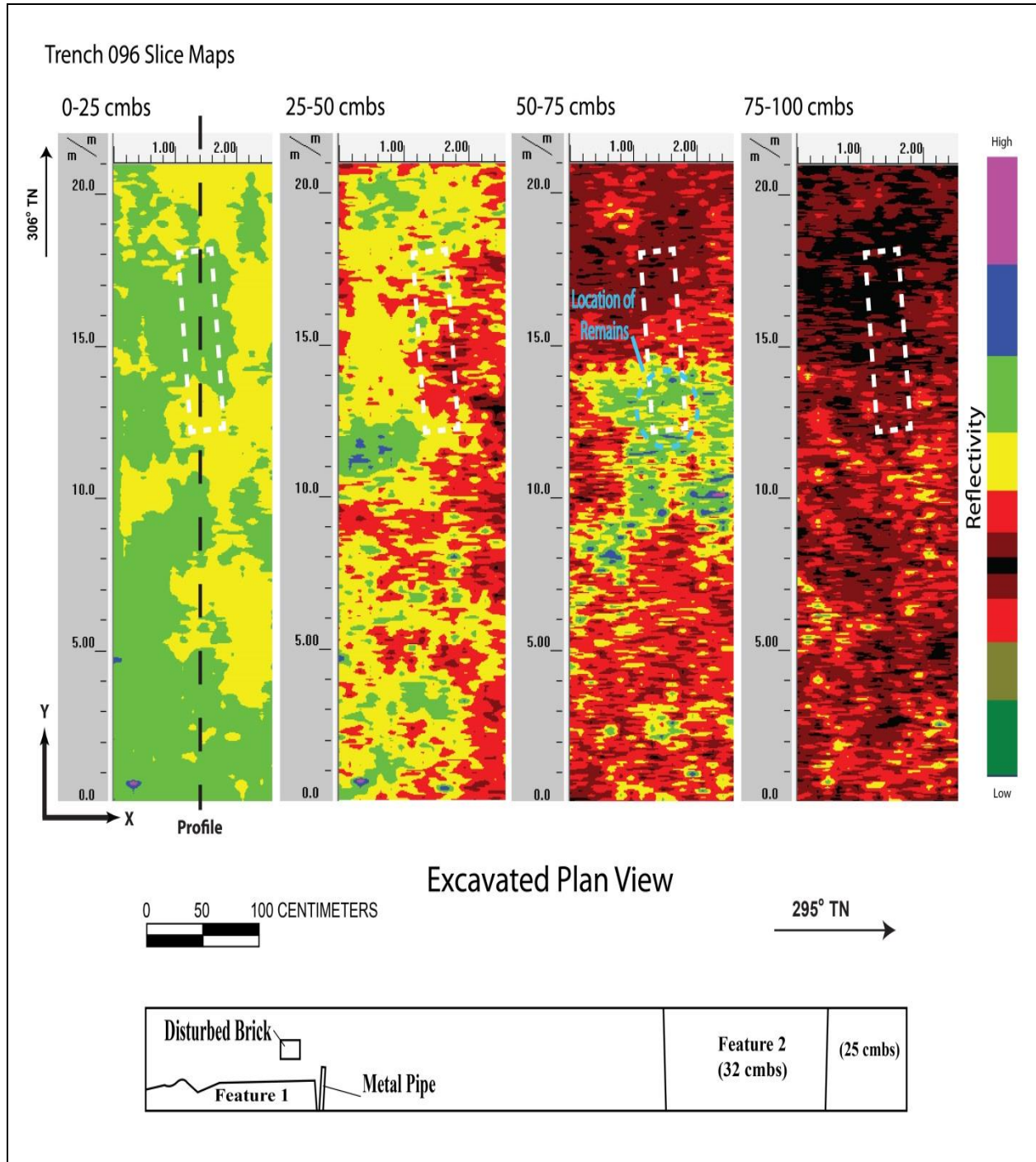


Figure 8. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 096

5.2 Test Excavation 141

5.2.1 Excavation Results

Test Excavation 141 (T-141) consisted of seven fill strata (Ia-Ig) overlying a subsurface, culturally enriched, A-horizon (Stratum II) with four associated features (Features 1-4) (SIHP# 50-80-14-5820). Beneath the A-horizon was natural, Jaucas sand (Stratum III), and a natural lagoonal silty sand (Stratum IV). The former A-horizon was composed of light brownish gray loamy sand and ranged in depth from 0.43 mbs to 0.7 mbs. It appeared to be utilized into the historic period as clear glass and ceramic fragments and rusted metal pieces were observed within the layer. The stratum contained charcoal, midden, organics, and faunal remains (pig, dog, and bird). One traditional Hawaiian artifact, a *he'e* or octopus lure, was observed at the interface of the former A-horizon and the underlying natural Jaucas sand.

Isolated human skeletal remains were found throughout the former A-horizon in a disturbed context and ranged in depth from approximately 0.61 mbs to 0.75 mbs. Identified skeletal elements included mandible fragments (infant), multiple vertebrae, multiple rib fragments (both adult and infant), a left radius (infant), a long bone (infant), a manubrium, a right third metacarpal, two left second metacarpals, a proximal hand phalanx, an intermediate hand phalanx, two distal hand phalanges (infant), an os coxa, a right os coxa (infant), and a left calcaneus. Unless otherwise noted, the remains were adult. Based on the presence of adult and juvenile remains as well as duplication of adult elements, the minimum number of individuals (MNI) represented within this assemblage is three. Due to the paucity and fragmentary nature of the remains, neither sex nor ancestry was determinable.

SIHP# -5820 Feature 1 contained an *in situ* horse burial. Additionally, isolated human skeletal remains in a disturbed context were observed within the Feature 1 fill material. The identified elements are described above. This feature contained charcoal, midden, non-midden shell, and faunal remains (medium-sized mammal).

SIHP# -5820 Feature 2 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It contained midden.

SIHP# -5820 Feature 3 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It did not contain any traditional Hawaiian cultural material.

SIHP# -5820 Feature 4 was a pit extending down from the former A-horizon and intruding into the underlying natural sand layer. It contained a small amount of charcoal.

Additionally, previously disturbed and isolated human skeletal remains were documented within a historic/modern pit feature. It appears likely that when the historic/modern pit was excavated through the former A-horizon, it impacted human remains that were located within the former A-horizon and spread them throughout the pit fill. The remains were observed at 0.61 mbs and 0.63 mbs. An additional modern/historic pit feature was excavated through the former A-horizon; however, no human skeletal remains or traditional Hawaiian artifacts were observed within the second historic/modern pit fill.

5.2.2 GPR Interpretation

The human remains encountered during the excavation of T-141 were non-articulated and distributed throughout the test excavation. It is very difficult for the GPR to resolve such small objects, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains. A change in signal reflectivity and topography is noted occurring at the same depth and location of an isolated human bone (manubrium) found in the SW sidewall of the test excavation. The signal reflectivity is lower in this area and could imply a change in compaction or density of material. The signal topography is wavy and may represent disturbances in natural depositional patterns (). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation ().

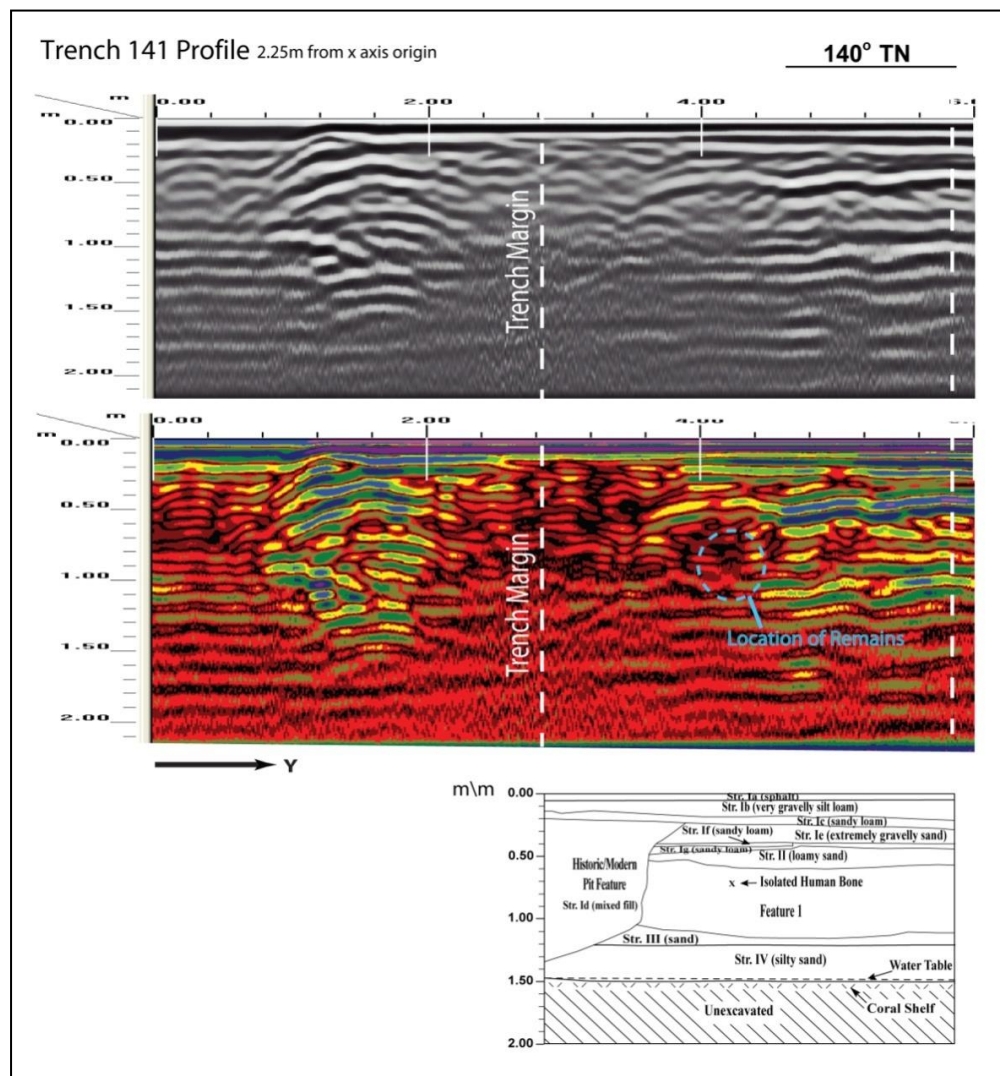


Figure 9. Visual comparison of excavated profile and GPR signal profile for Test Excavation 141

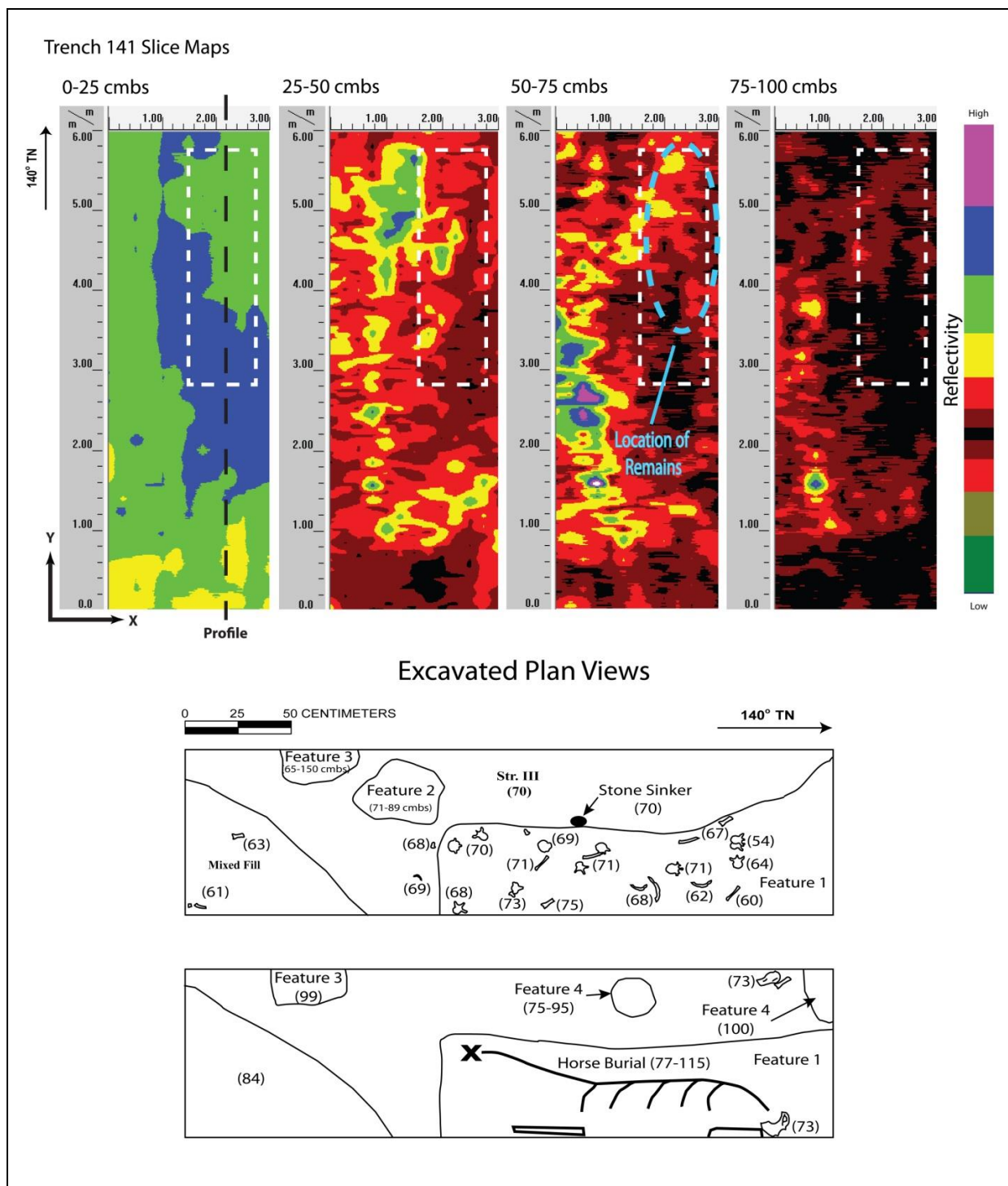


Figure 10. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 141

5.3 Test Excavation 142

5.3.1 Excavation Results

Test Excavation 142 (T-142) consisted of three fill strata (Ia-Ic) overlying a subsurface, culturally enriched, A-horizon (Stratum II) with four associated features (Features 5-8) (SIHP# 50-80-14-5820), natural Jaucas sand (Stratum III), and marine sand (Stratum IV). Additionally, an *in situ* human burial (SIHP# -5820 Feature 30) was documented in the natural Jaucas sand layer directly underlying the former A-horizon. The burial had a faint burial pit and it was unclear if the pit originated from the former A-horizon or the natural Jaucas sand layer.

The former A-horizon was composed of dark grayish brown sandy loam with charcoal flecking and ranged in depth from 0.47 mbs to 0.9 mbs. It appeared to have been utilized into the historic period as glass and ceramic fragments were observed within the upper portion of the layer. A bulk sample of this stratum contained charcoal, midden, and miscellaneous, non-midden gastropods and limpets.

The *in situ* burial (SIHP# -5820 Feature 30) was only minimally uncovered. The burial pit ranged in depth from 0.80 mbs to 1.25 mbs. The skeletal remains ranged in depth from 1.00 mbs to 1.12 mbs. Based on the observable remains and the size of the burial pit, the burial was flexed or partially flexed. The head appeared to be to the north, while the feet appeared to be to the south. The size of the remains suggested that the burial consisted of an adult or adolescent individual. Neither sex nor ancestry was able to be determined osteologically; however, based on the location and size of the burial, along with a lack of grave goods, the burial is likely traditional Hawaiian.

SIHP# -5820 Feature 5 contained traditional Hawaiian artifacts, including an '*ulu maika*'; a fire-cracked, water-worn basalt cobble; and several flakes from fire-cracked rocks. Historic artifacts were also documented within this feature: two pottery shards and rusted metal pieces were documented. Additionally, this feature contained charcoal, non-midden shell, and fish remains.

SIHP# -5820 Feature 6 contained both traditional Hawaiian and historic artifacts. Historic artifacts included a possible ceramic fragment, a clear glass fragment, and a piece of rusted metal. The single traditional Hawaiian artifact was identified as a shell fishhook. Additionally, charcoal, midden, non-midden shell, water-worn rocks, and faunal remains (cow, fish, rat) were documented.

SIHP# -5820 Feature 7 contained charcoal, midden, non-midden shell, a fragment of vesicular basalt, faunal remains (bird, cow, pig, fish), and several historic artifacts (earthenware, ceramic, metal, and glass fragments).

SIHP# -5820 Feature 8 contained a small amount of charcoal, midden, non-midden shell, and faunal remains (pig, cow, dog, fish).

5.3.2 GPR Interpretation

The human remains encountered during the excavation of T-142 consisted of an *in situ* burial discovered naturally deposited Jaucus sand. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the burial (). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features observed during excavation (). This burial (SIHP # -5820 Feature 30) represents the only *in situ*, fully articulated human remains discovered during Section 4.

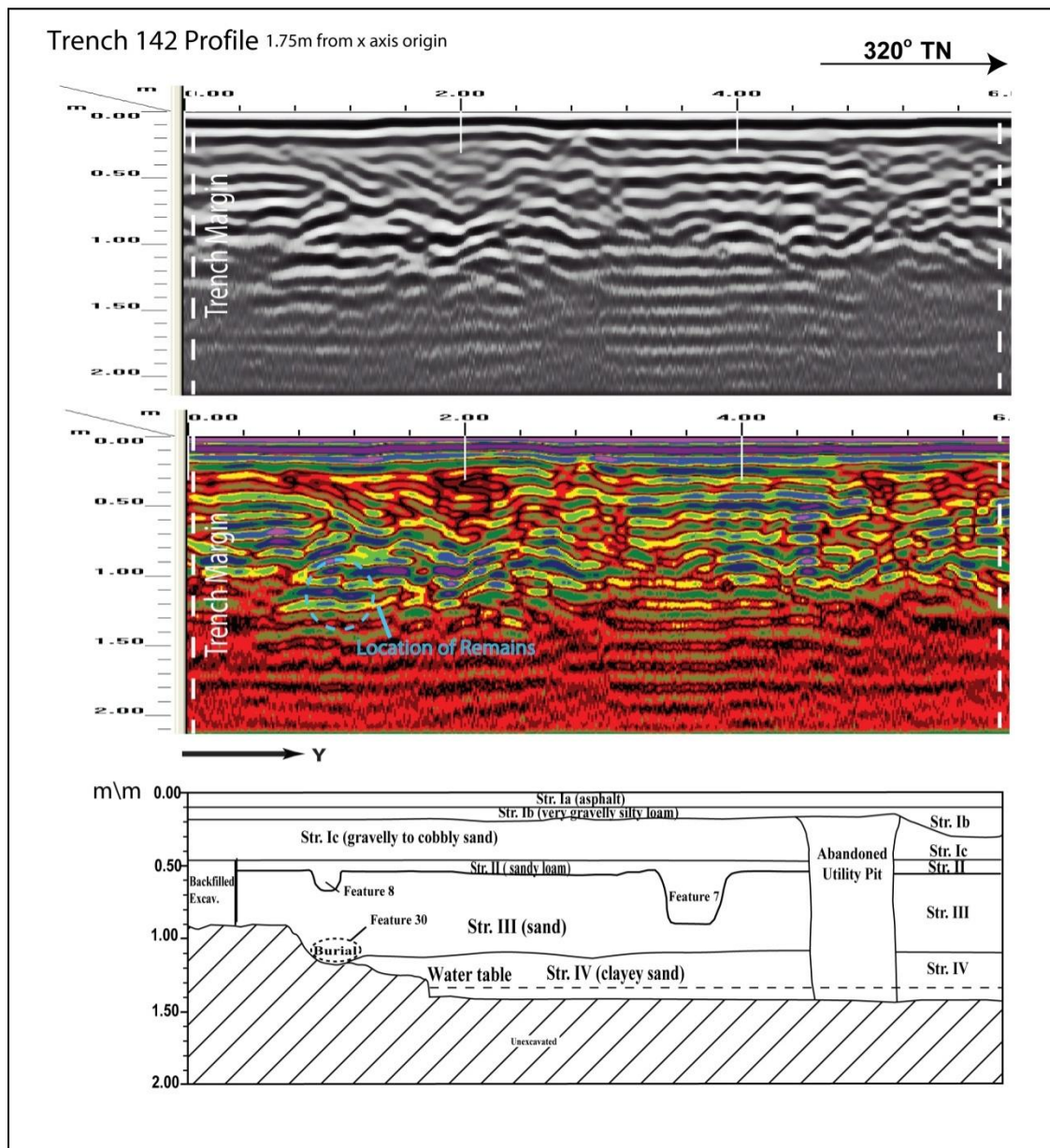


Figure 11. Visual comparison of excavated profile and GPR signal profile for Test Excavation 142

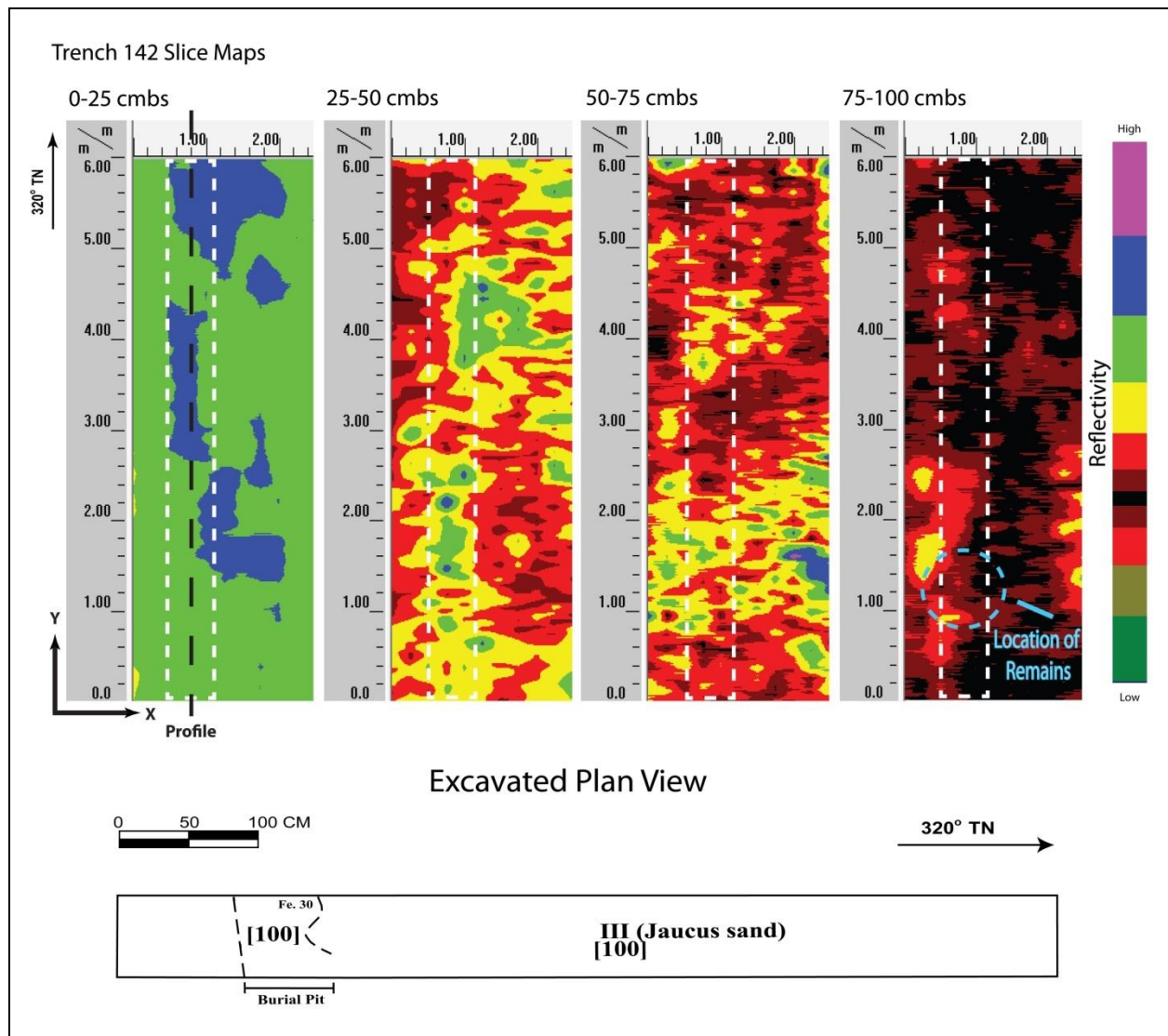


Figure 12. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 142

5.4 Test Excavation 150

5.4.1 Excavation Results

Test Excavation 150 (T-150) consisted of three fill strata (Ia-Ib) overlying a subsurface, culturally enriched, former A-horizon (Stratum II) with three associated features (Features 18-20) (SIHP# 50-80-14-5820), and three natural sand layers (Stratum IIIa-IIIc). Fill strata included a concrete sidewalk (Stratum Ia), extremely gravelly silty clay base course (Stratum Ib), and a gravelly silty loam (Stratum Ic) that contained bits of brick, metal and glass construction debris in addition to crushed coral. The subsurface, culturally enriched former A-horizon was composed of pale brown loamy sand and undulated in depth from 0.70 mbs to 1.27 mbs. The three associated features originated from the A-horizon and contained shell midden, fire-cracked rock, a water-rounded cobble, a possible human modified basalt fragment, and faunal remains (pig, fish, and possibly cat).

SIHP # -5820 Feature 18 contained a single human skeletal element encountered at a depth of 0.75 mbs to 1.05 mbs. A CSH osteologist identified the fragment to be a posterior fragment of a proximal tibia. The fragment was 0.08 m in length and was bevelled on one end with a polished sheen. Whether this bone fragment was from the right or left tibia or whether it was from a male or female human was not able to be determined. It was decided, however, that the bone had been fractured while still in a fresh state (perimortem trauma) producing the existing fragment. From the cut marks on the bone it was also concluded to have been cut by a repetitive sawing motion and that this motion led to the further polished appearance.

SIHP# -5820 Feature 18 was a dark, charred, undulating intrusion into the Jaucas sand extending down from the former A-horizon. Feature 18 was found from 0.75 mbs to 1.05 mbs and was 0.75 m wide. It contained a worked human bone, fire-cracked rock, shell midden and a modified basalt fragment. The modified basalt fragment had been worked smooth and had striations on one side and was a possible adze fragment.

SIHP# -5820 Feature 19 was an undulating pit extending down from the former A-horizon and intruding into Feature 20 and into the natural Jaucas sand. The feature was found 0.53 mbs to 0.95 mbs and was 1.25 m wide and extending into the south end of the excavation. It contained charcoal, shell midden, non-midden shell, fish remains, and fire-cracked rock.

SIHP# -5820 Feature 20 was a dark charred intrusion extending down from the former A-horizon and intruding into the underlying natural Jaucas sand layer. Feature 20 was 0.90 mbs to 1.30 mbs and 20cm wide and found on the northeast profile only. This feature was truncated by Feature 2. Feature 3 contained charcoal, midden, non-midden shell, a small fragment of volcanic glass, and fish remains.

The excavation of T-150 was halted upon discovery of the human remains. After the human remains were secured and with the permission of the SHPD/OIBC, the remainder of T-150 to the water table. No other human remains were encountered.

5.4.2 GPR Interpretation

The human remains encountered during the excavation of T-150 consisted of a posterior fragment of a proximal tibia located in Jaucas sand. It is very difficult for the GPR to resolve

such a small object, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (). The slice maps do not clearly indicate the presence of pit features based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation ().

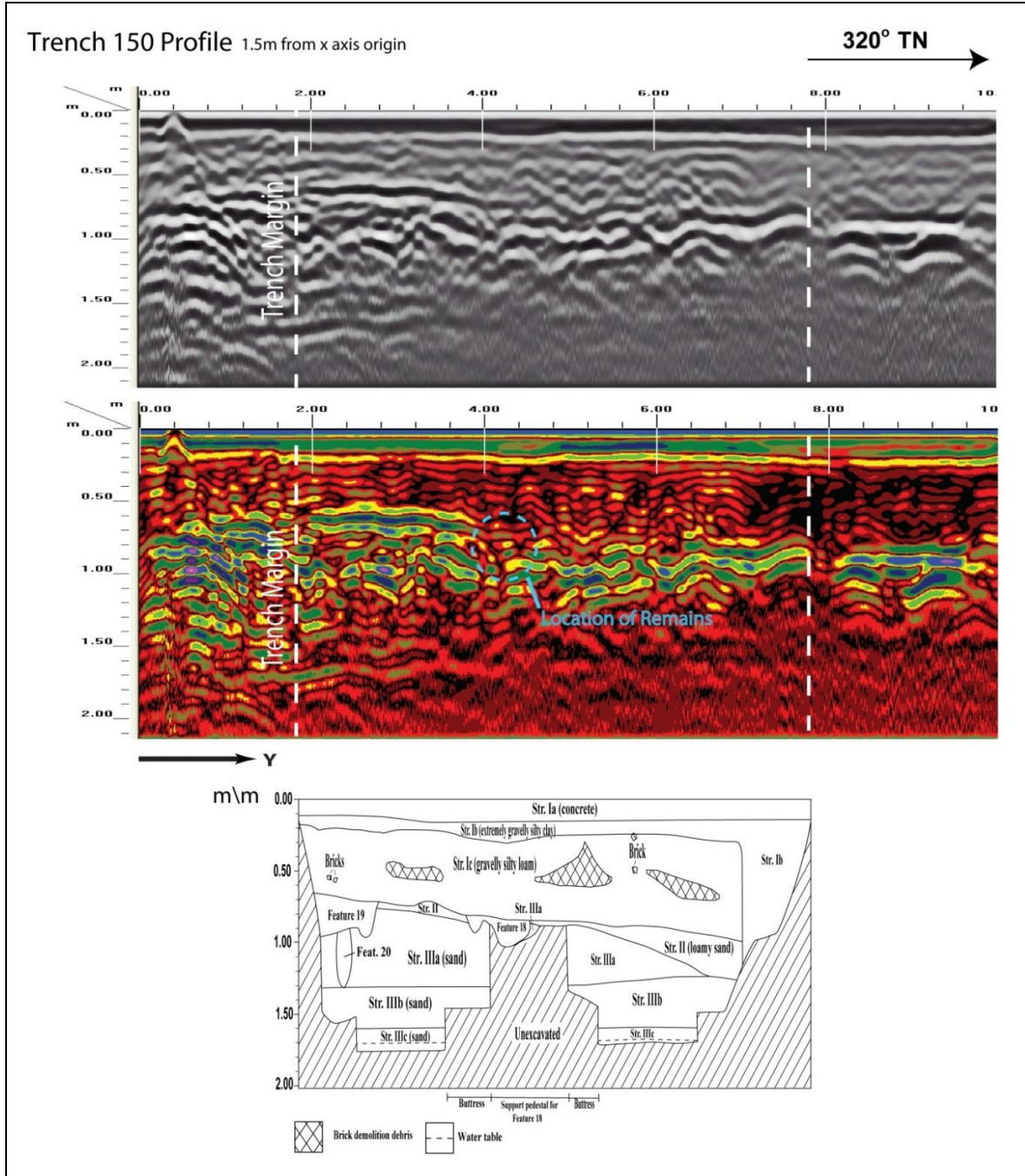


Figure 13. Visual comparison of excavated profile and GPR signal profile for Test Excavation 150

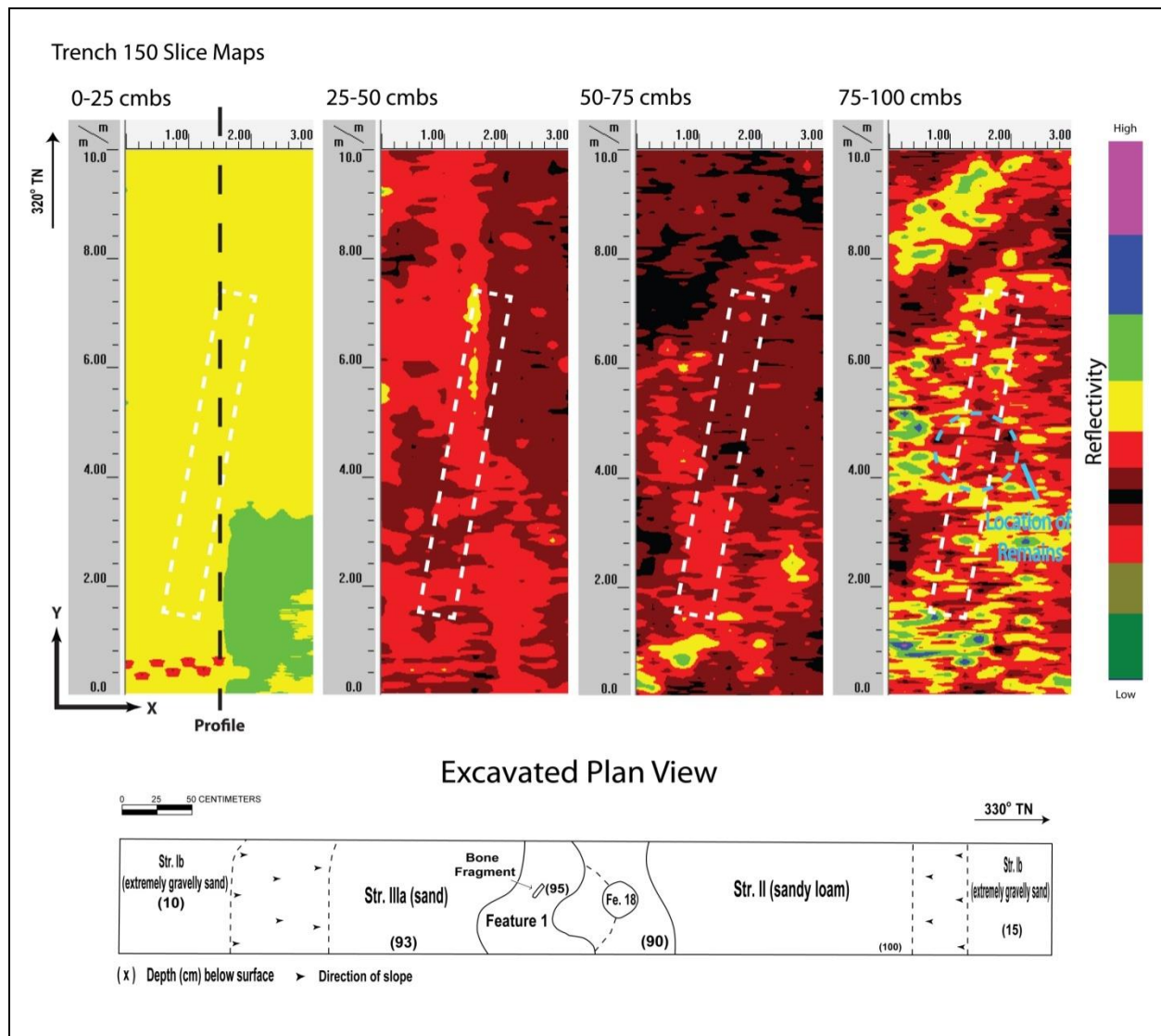


Figure 14. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 150

5.5 Test Excavation 170

5.5.1 Excavation Results

Test Excavation 170 (T-170) contained four layers of construction fill (Strata Ia-Id), a subsurface A-horizon (Stratum II) (SIHP # 50-80-14-7429), natural Jaucas sand (Stratum III), a loamy sand (Stratum IV), and finally a shallow marine sediment (Stratum V). The subsurface, A-horizon was a very dark, grayish brown (10YR 3/2) coarse, silty, sand. This subsurface A-horizon was encountered at depths of 0.41 mbs to 0.75 mbs. No features or pits observed within this stratum. When the excavation was completed and a bulk sample was being collected from the western end of the southeast sidewall, at 0.65 mbs, a human cranial fragment (SIHP # -7429 Feature 6) was exposed.

The isolated human cranial fragment (SIHP # -7429 Feature 6) was determined by a CSH osteologist to be a left temporal fragment including the mastoid process portion and root of the zygomatic arch. The fragment was approximately 0.06 m by 0.06 m and found *in situ* in the sidewall. The rest of the segment was still in place in the sidewall and the limited exposure prevented determination of age and sex. However, the exposed fragment allowed the determination that it was human in origin. In addition, the exposed bone was small and gracile. This could indicate that the subject might have been either a female or a young adult.

The excavation of T-170 was complete upon discovery of the human cranial fragment in the southwest wall but since a bulk sample of the A-horizon was in progress upon finding the fragment, further collections of soils and other samples was halted. The natural sand layers below the A-horizon were observed before the cranial discovery to a final depth of 1.16 m. No additional features or human remains were encountered during excavation.

5.5.2 GPR Interpretation

The human remains encountered during the excavation of T-170 consisted of a left temporal fragment located in Jaucas sand. It is very difficult for the GPR to resolve such a small object, especially in a disturbed context with natural sediments truncated by fill events. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (). The slice maps do not clearly indicate the presence of pit features based on distinguishable shapes formed from changes in reflectivity ().

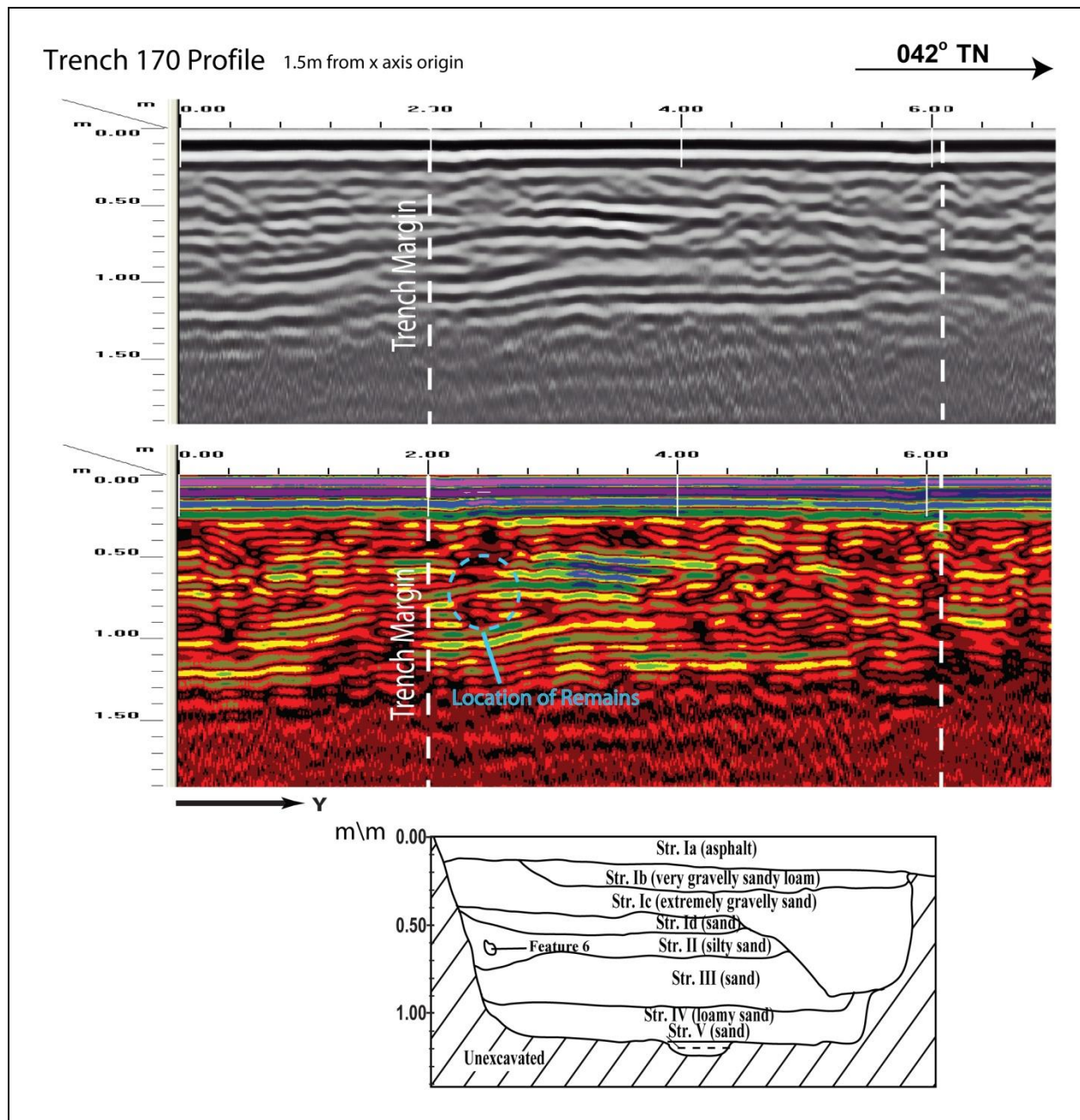


Figure 15. Visual comparison of excavated profile and GPR signal profile for Test Excavation 170

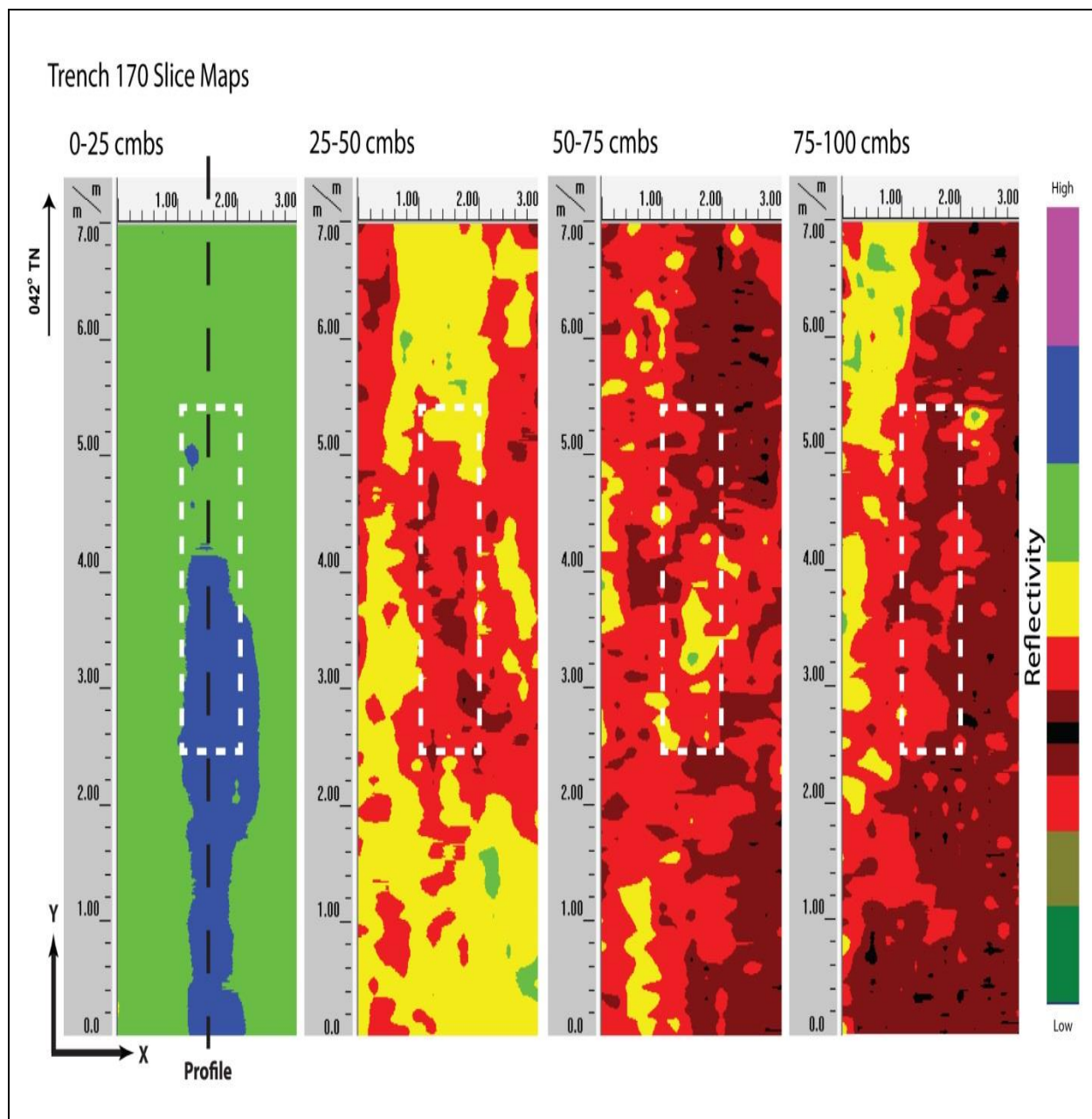


Figure 16. GPR slice maps for Test Excavation 170

5.6 Test Excavation 226C

5.6.1 Excavation Results

Test Excavation 226C (T-226C) consisted of four fill strata (Ia-Id), followed by the naturally occurring Jaucas sand (Stratum II). Stratum Ia consisted of asphalt, Stratum Ib was a gravelly clay loam designated as utility test excavation fill, Stratum Ic was a mixed fill of extremely gravelly loamy sand with a very disturbed A-horizon near its lower boundary. Stratum Id was a re-deposited sand layer. During excavation four features (Features 12, 13, 29, and 30) were observed originating from Stratum Ic and the disturbed A-horizon. The disturbed, subsurface A-horizon and associated Features 12, 13, 29, and 30 were designated components of SIHP # 50-80-14-2198.

A total of four features (SIHP # -2198 Features 12, 13, 29, and 30) were documented within T-226C. Feature 29 and Feature 30 were documented as extensions of the locally-procured mixed loamy sand fill (Stratum Ic). Feature 12 was documented as a truncated pit that was observed at the lower boundary of the locally-procured sand fill (Stratum Id) extending to within natural Jaucas sand (Stratum II). Feature 13 was documented as a burial pit containing previously disturbed human remains that was observed at the lower boundary Stratum Id extending to within natural Stratum II.

The human pelvis designated as SIHP # -2198 Feature 13, was found between Stratum Id and the natural sand in Stratum II at a depth of 1.15 mbs, 0.10 m above the water table and coral shelf. A CSH osteologist confirmed that the remains were human. The remains appeared to be the fragmented remains of a left and right oscoxae and a sacrum. There was no observed articulation, however the remains could have continued into the south wall. A small pit was apparent in the south wall surrounding the remains and included a fragmented ceramic dish that was recovered from within the pit staining, 0.04 m above the remains. The condition of the remains indicated a previously disturbed context, considering there was no observed articulation and that the fragmented ceramic dish was found above the remains. This may suggest the burial represents either a secondary burial or that the remains were previously disturbed from an *in situ* burial. No further excavation was conducted in the vicinity of the remains and the age and sex of the remains was not determined.

SIHP # -2198 Feature 29 originated at 0.78 m below surface and terminated at 0.97 m below surface. Feature 29 was circular-shaped in plan and measured 0.42 m long by more than 0.21 m wide, extending into one excavation sidewall. In profile, Feature 29 was observed as a diffuse pit with downward tapering sidewalls and a rounded bottom. The sediment comprising Feature 29, and the sediment of the associated fill layer (Ic) appears to consist of the redeposited, culturally-enriched A-horizon mixed with other fill material. The stratigraphic association with fill deposits (Ic) above the former land surface indicates that Feature 29 likely post-dates Feature 12 (pit feature) and Feature 13 (burial).

SIHP # -2198 Feature 30 originated at 0.70 m below surface and terminated at 1.13 m below surface. Feature 30 was circular-shaped in plan and measured 0.30 cm long by more than 0.15 m wide, extending into one excavation sidewall. In profile, Feature 30 was observed as a pronounced pit with straight sides and a slightly rounded bottom containing a preserved wooden post. A wooden post and fire-cracked rock were collected from Feature 30 and the feature is

interpreted as a post mold containing a preserved post. The stratigraphic association with fill deposits (Ic) above the former land surface indicates that Feature 30 likely post-dates Feature 12 (pit feature) and Feature 13 (burial).

SIHP # -2198 Feature 12 originated at 1.14 m below surface and terminated at 1.39 m below surface, 0.09 m below the documented water table. Feature 12 was ovular-shaped in plan and measured 0.30 m long by more than 0.07 m wide, extending into one excavation sidewall. In profile, Feature 12 was observed as being horizontally truncated by the overlying sand fill (Id). The pit was clearly defined with straight sides and a rounded base. Feature 12 was interpreted as a remnant pit feature that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits. The function of Feature 12 is indeterminate.

SIHP # -2198 Feature 13 originated at 1.15 m below surface and terminated beyond the base of excavation of T-226C. The Feature 13 burial pit was generally circular-shaped in plan and measured 0.45 m long by more than 0.23 m wide, extending into one excavation sidewall. Feature 13 was not observed in profile as excavation was ceased upon the discovery of the human skeletal remains. Feature 13 was covered, a 0.50 m buffer was formed, and the buffer and feature were pedestaled as excavation continued to beneath the water table in the northwest and southeast portions of T-226C. Feature 13 is considered to be a burial pit containing human skeletal remains that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits.

5.6.2 GPR Interpretation

The human remains encountered during the excavation of T-226C consisted of a non-articulated pelvis located between Stratum Id and the natural sand in Stratum II at a depth of 1.15 mbs, 0.10 m above the water table and coral shelf. The location of the remains was beyond the range of clean signal return. There are no distinct hyperbolic reflections observed in the profile that can clearly be linked to the remains (). Although a distinct pit was associated with the remains, the slice maps do not clearly indicate the presence of a pit feature based on significant changes in reflectivity. No distinct shapes are observed in the slices that correspond to features located during excavation ().

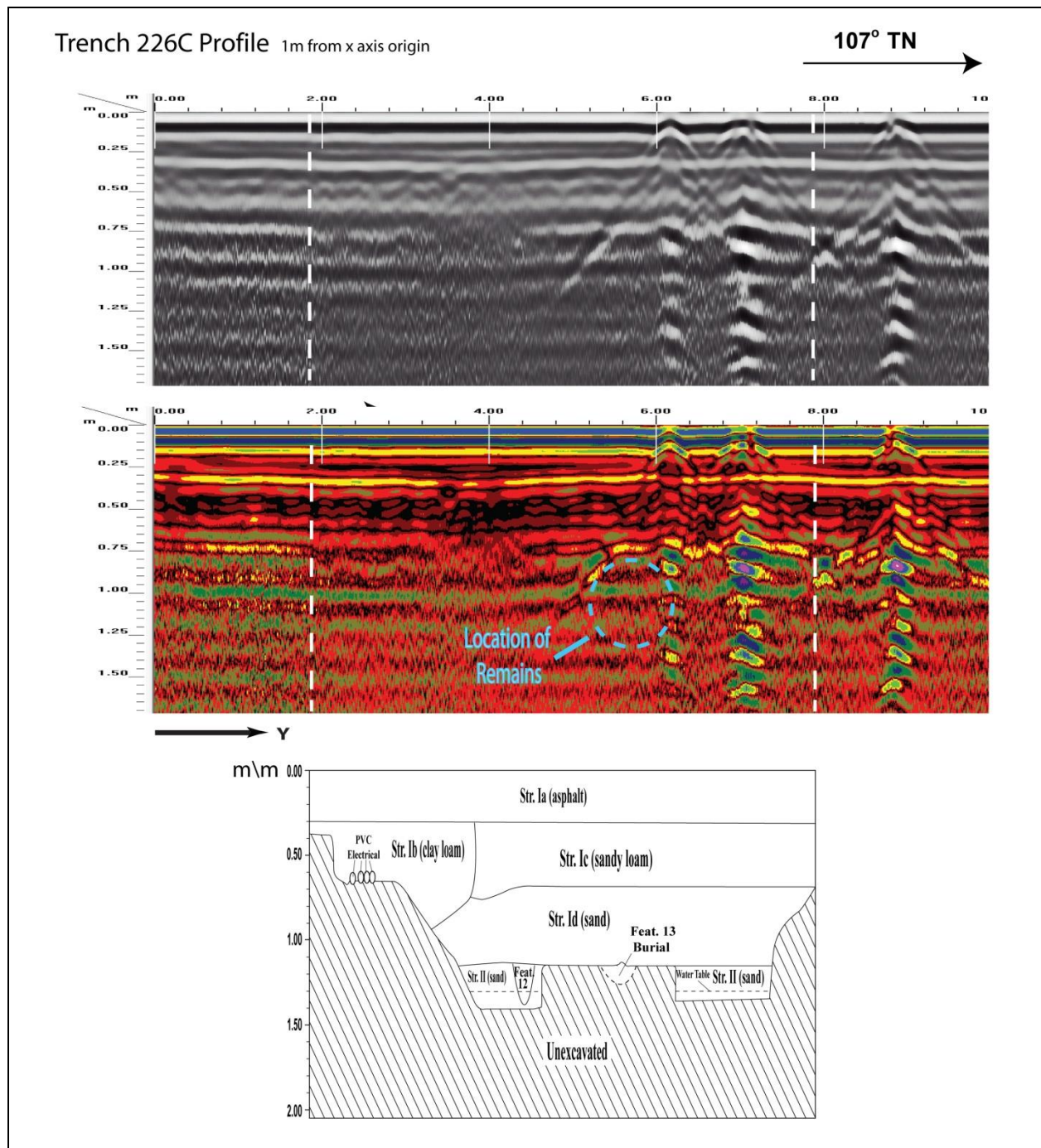


Figure 17. Visual comparison of excavated profile and GPR signal profile for Test Excavation 226C

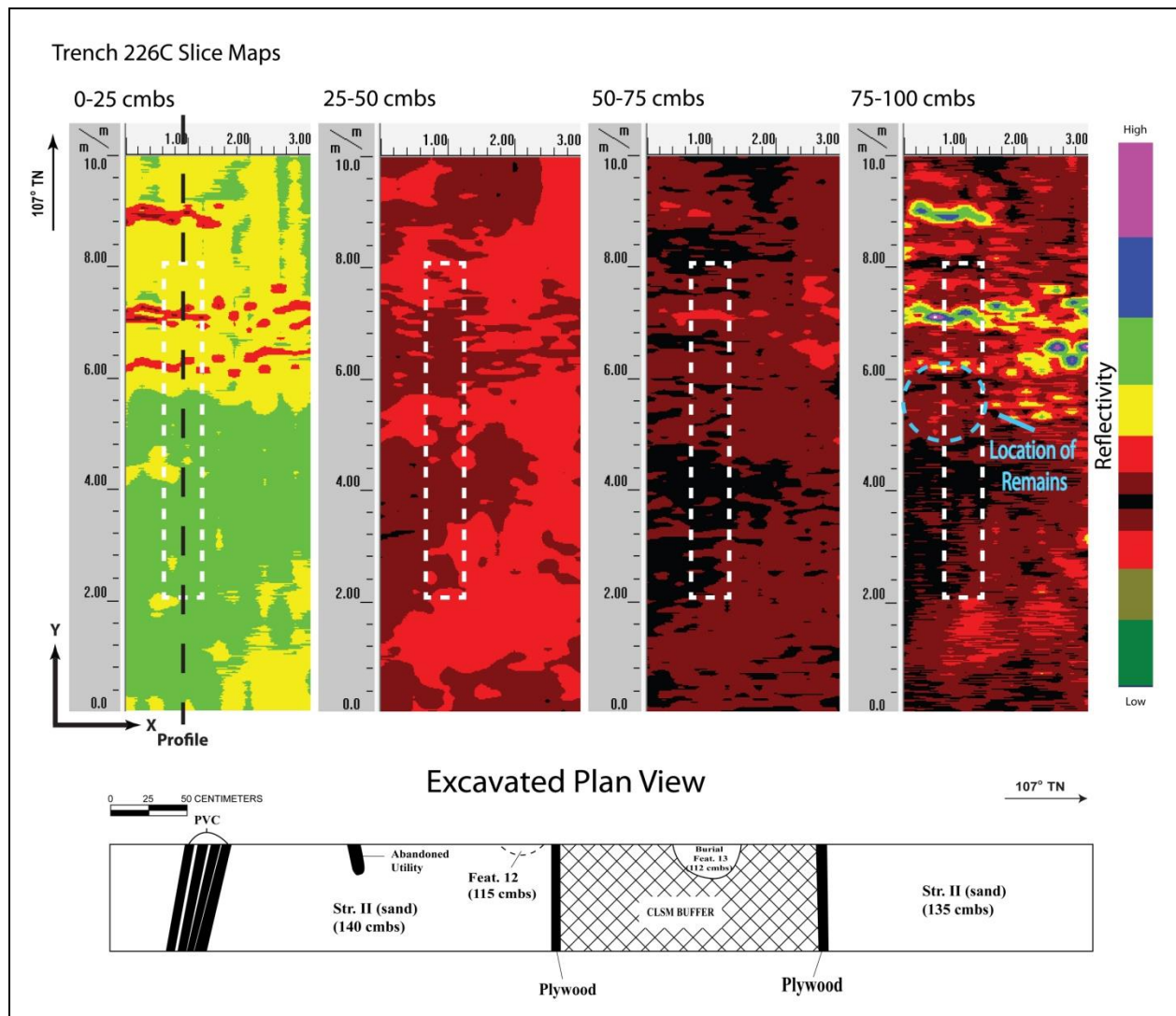


Figure 18. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 226C

5.7 Test Excavation 227A

5.7.1 Excavation Results

Test Excavation 227A (T-227A) consisted of four fill strata (Ia-Id), a culturally enriched A-horizon (Stratum II), natural Jaucas sand (Stratum III), clay sand (Stratum IV), and the coral shelf at 1.4 m (Stratum IV). The subsurface A-horizon consisted mostly of marine shell midden, and fire cracked rock. The subsurface A-horizon and four associated features (Features 22, 23, 25, and 26), and the natural Jaucas sand and two associated features (Features 24 and 27) were designated components of SIHP # 50-80-14-2918.

A partial human burial (SIHP # -2918 Feature 27) was discovered at 1.25 mbs in the natural Jaucas (Stratum III) within the northeast section of T-227A. A CSH osteologist determined the burial contained the remains of a juvenile individual (0-3 years old). The remains were observed to be extremely fragile, and in poor condition. Limited exposure of cranial fragments prevented determination of a precise age and/or sex of the remains. No visible pit outline was observed surrounding the burial.

SIHP # -2918 Feature 22 was found in the center of the excavation at Stratum II at a depth of 1.03 mbs to 1.08 mbs. It was observed as a dark, square shaped, stain. Shell midden, faunal bone (fish), fire cracked rock, and a brick fragment was recovered from this feature.

SIHP # -2918 Feature 23 was found in the northeast portion of the test excavation floor in Stratum II at a depth of 1.08 mbs to 1.31 mbs. This feature was a circular staining in the soil and the recovery, after a gallon of soil screening, revealed shell midden, faunal bone and some historic. Further charcoal analysis indicated a date of AD 1720-1810, a late pre-contact early post contact charcoal pit (*kopiko* and *lama*).

SIHP # -2918 Feature 24 was a pit feature found in Stratum III at a depth of 1.17 mbs to 1.30 mbs. It was a circular staining that produced shell midden and faunal bone (medium mammal and a shark tooth).

SIHP # -2918 Feature 25 was a pit feature found in the southeast side wall that had originated from Stratum II and was found at depth 0.94 mbs to 1.08 mbs. The recovery from this feature was shell midden, faunal bone (fish), and volcanic glass.

SIHP # -2918 Feature 26 was a pit feature found in the southeast side wall and originated at the diffuse lower boundaries of Stratum II and Stratum III at a depth of 1.12 mbs to 1.37 mbs. The recovery of this feature was shell and faunal bone (*Canis lupus familiaris*).

Excavation of T-227A was halted upon discovery of SIHP # -2918 Feature 27. In consultation with SHPD, a two meter long segment extending from Feature 27 was left undisturbed. The remaining portion of the test excavation was excavated by hand to a depth of 1.4 m at the coral shelf. No further human remains were encountered during excavation.

5.7.2 GPR Interpretation

The human remains encountered during the excavation of T-227A consisted of a partial juvenile burial located in naturally deposited Jaucas sand. The location of the remains was beyond the range of clean signal return. There are no distinct hyperbolic reflections observed in

the profile that can clearly be linked to the remains (). No distinct pit features were associated with the remains. The slice maps do not clearly indicate the presence of any features observed during excavation based on discernible shapes created from significant changes in reflectivity ().

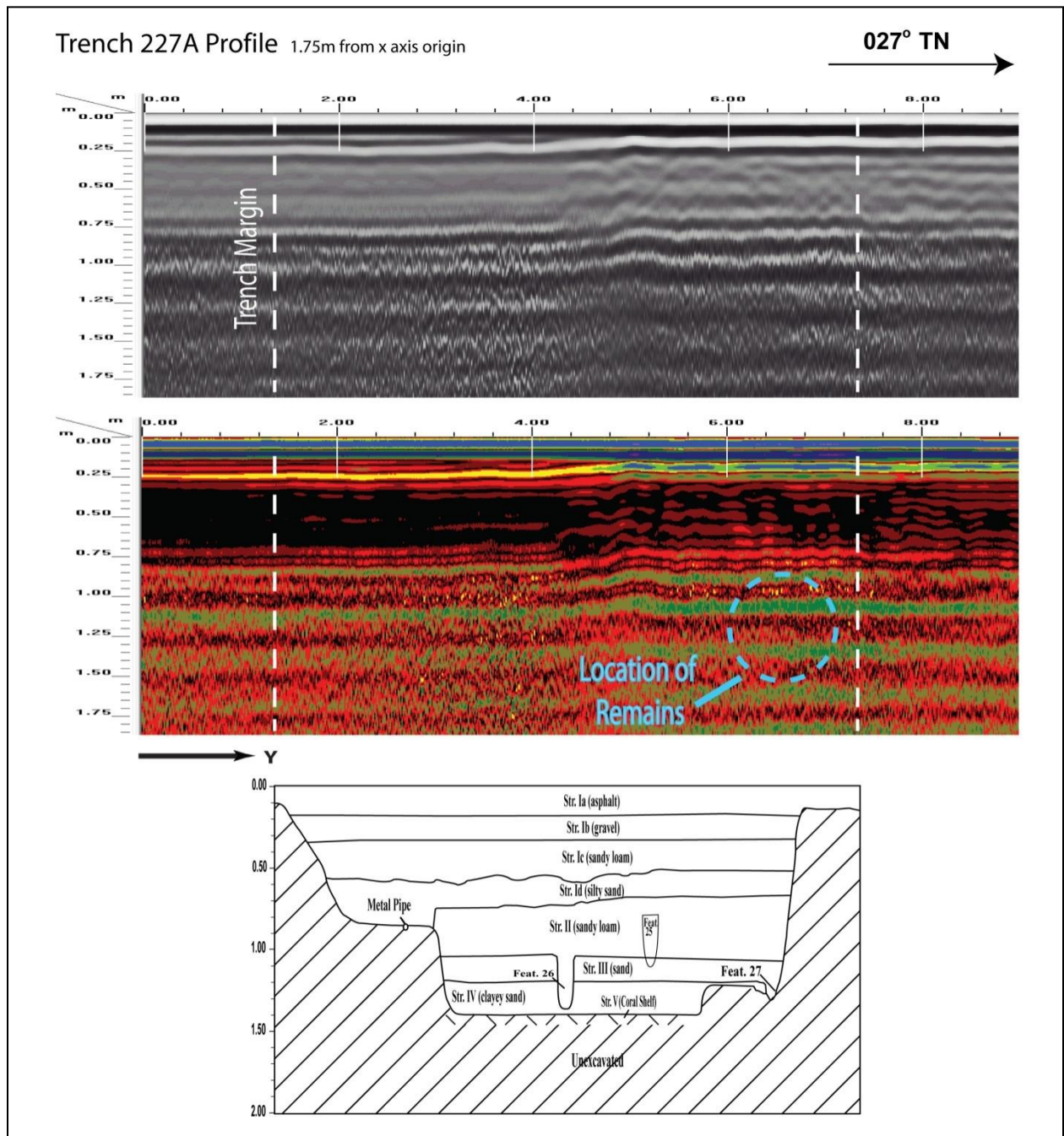


Figure 19. Visual comparison of excavated profile and GPR signal profile for Test Excavation 227A

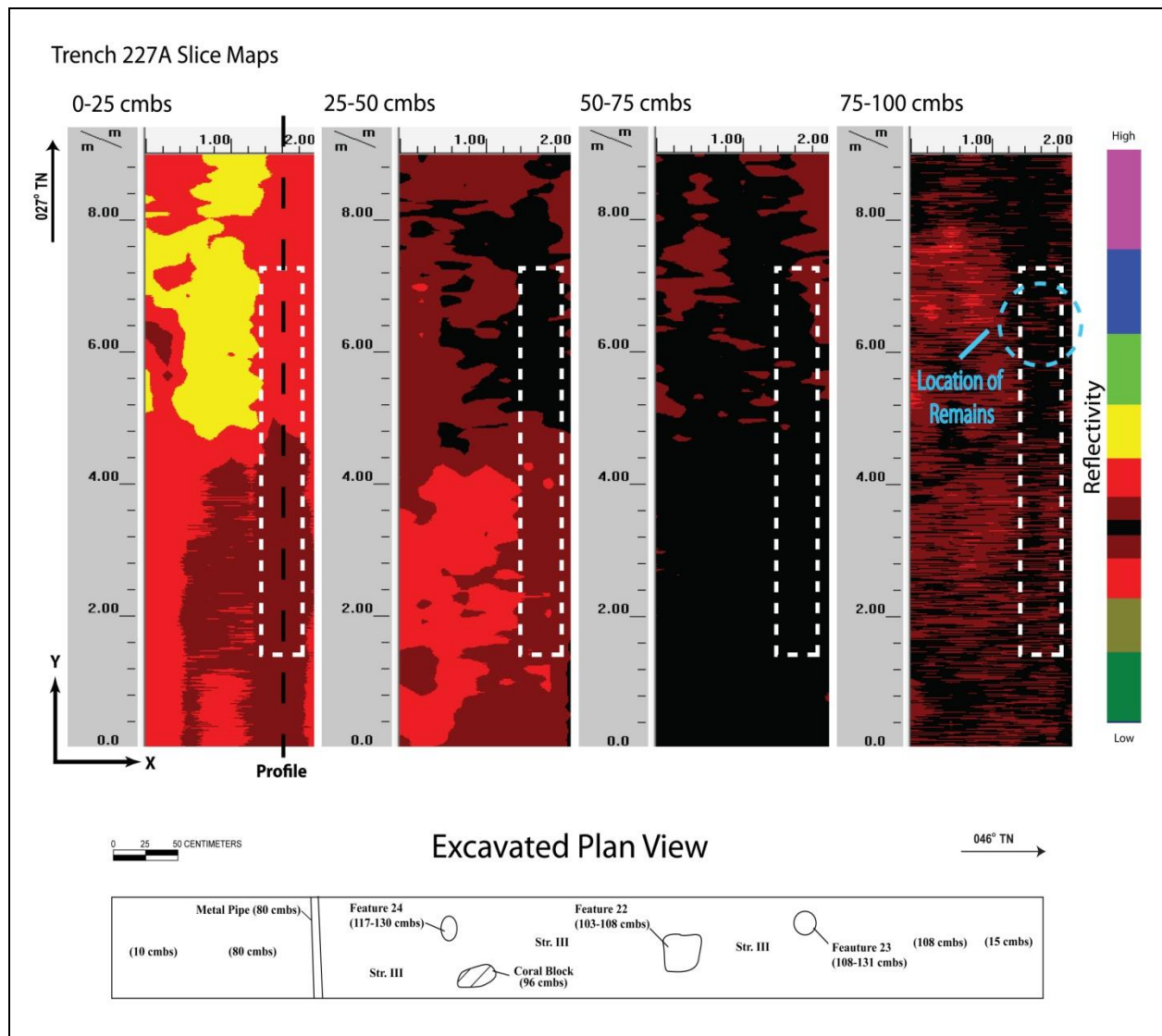


Figure 20. Visual comparison of excavated plan views and GPR slice maps for Test Excavation 227A